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Authorised and notified according to Article 10 of the Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products

MEMBER OF EOTA

## European Technical Approval ETA-11/0344

Trade name:

BOSSONG BCR EPOXY 21

Holder of approval:

BOSSONG SPA  
Via Enrico Fermi 51  
IT-24050 Grassobbio (Bg)  
Tel. +39 035 3846 011  
Fax +39 035 3846 012  
Internet [www.bossong.com](http://www.bossong.com)

Generic type and use of construction product:

Bonded anchor with anchor rod made of galvanized steel or stainless steel of sizes M8, M10, M12, M16, M20, M24, M27 and M30 for use in concrete

Valid from:  
to:

2011-09-15  
2016-09-15

Manufacturing plant:

BOSSONG SPA  
Via Enrico Fermi 51  
IT-24050 Grassobbio (Bg)

This European Technical Approval contains:

24 pages including 16 annexes which form an integral part of the document



European Organisation for Technical Approvals

Europæisk Organisation for Tekniske Godkendelser

## **I LEGAL BASIS AND GENERAL CONDITIONS**

1 This European Technical Approval is issued by ETA-Danmark A/S in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, as amended by Council Directive 93/68/EEC of 22 July 1993<sup>2</sup>.
- Bekendtgørelse 559 af 27-06-1994 (afløser bekendtgørelse 480 af 25-06-1991) om ikrafttræden af EF direktiv af 21. december 1988 om indbyrdes tilnærmelse af medlemsstaternes love og administrative bestemmelser om byggevarer.
- Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC<sup>3</sup>.
- ETAG 001 - Guideline for European Technical Approval of metal anchors for use in concrete – Part 5: Bonded anchors

2 ETA-Danmark A/S is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.

3 This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European Technical Approval.

4 This European Technical Approval may be withdrawn by ETA-Danmark A/S pursuant to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of ETA-Danmark A/S. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.

6 This European Technical Approval is issued by ETA-Danmark A/S in English. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

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1 Official Journal of the European Communities N° L40, 11 Feb 1989, p 12.

2 Official Journal of the European Communities N° L220, 30 Aug 1993, p 1.

3 Official Journal of the European Communities N° L 17, 20 Jan 1994, p 34.

## **II SPECIAL CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL**

### **1 Definition of product and intended use**

The BOSSONG BCR Epoxy 21 is a bonded anchor (injection type) consisting of an injection mortar cartridge using an applicator gun equipped with a special mixing nozzle and threaded anchor rod of the sizes M8 to M30 made of galvanized carbon steel or stainless steel A4-70 or A4-80: 1.4401, 1.4404, 1.4571 or high corrosion resistant stainless steel A4-70: 1.4529, 1.4565, 1.4547 with hexagon nut and washer.

The threaded rod is placed into a drilled hole previously injected with a mortar with a slow and slight twisting motion. The anchor rod is anchored by the bond between rod, mortar and concrete.

The threaded rod is available for all diameters with three type of tip end: a one side 45° chamfer, a two sided 45° chamfer or a flat. The threaded rods are either delivered with the mortar cartridges or commercial standard threaded rods purchased separately. The mortar cartridges are available in different sizes: 265 ml, 400 ml and 900 ml. The anchors are intended to be used with embedment depth given in Annex 2, Table 1.

For the installed anchor see Figure given in Annex 1.

#### **Intended use**

The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106/EEC shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences. Safety in the case of fire (Essential Requirement 2) is not covered by this ETA. The anchors are to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206-1.

The anchors may be anchored in cracked (M12 to M24) or non-cracked concrete (M8 to M30).

The anchors may be installed in dry or wet concrete (use category 1) or in flooded holes with the exception of seawater (use category 2). All the diameters (from M8 to

M30) may be used overhead.

The anchors may be used in the following temperature range:

- a) -40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C),
- b) -40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C).

Elements made of galvanized steel may be used in structures subject to dry internal conditions only.

Elements made of stainless steel may be used in structures subject to dry internal conditions and also in concrete subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Elements made of high corrosion resistant steel may be used in structures subject to dry internal conditions and also in concrete subject to external atmospheric exposure or exposure in permanently damp internal conditions or in other particular aggressive conditions. Such particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

#### **Assumed working life**

The provisions made in this European Technical Approval are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Approval Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## **2 Characteristics of product and assessment**

### **2.1 Characteristics of product**

The anchor in the range of M8 to M30 and the mortar cartridges corresponds to the drawings given in the Annex 1 to 4. The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation<sup>4</sup> of this European Technical Approval.

The characteristic anchor values for the design of anchorages are given in Annexes 12 to 16.

Each mortar cartridge is marked with the identifying mark of the producer and with the trade name. The threaded rod are either delivered with the mortar cartridges or commercial standard threaded rods purchased separately.

The BOSSONG BCR Epoxy injection mortar is delivered in mortar cartridges in a size of 265 ml, 400 ml and 900 ml in accordance with Annex 4.

### **2.2 Methods of verification**

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the « Guideline for European Technical Approval of Metal Anchors for use in Concrete », Part 1 « Anchors in general » and Part 5 « Bonded anchors », on the basis of Option 1 and 7.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

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<sup>4</sup> The technical documentation of this European Technical Approval is deposited at ETA-Danmark and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies

### **3 Attestation of Conformity and CE marking**

#### **3.1 Attestation of Conformity system**

The system of attestation of conformity 2 (i) (referred to as system 1) according to Council Directive 89/106/EEC Annex III laid down by the European Commission provides:

- a) tasks for the manufacturer:
  - 1. factory production control,
  - 2. further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan.
- b) tasks for the notified body:
  - 3. initial type-testing of the product,
  - 4. initial inspection of factory and of factory production control,
  - 5. continuous surveillance, assessment and approval of factory production control.

#### **3.2 Responsibilities**

##### **3.2.1 Tasks of the manufacturer**

###### **3.2.1.1 Factory production control**

The manufacturer has a factory production control system in the plant and exercises permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer are documented in a systematic manner in the form of written policies and procedures. This production control system ensures that the product is in conformity with the European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan<sup>5</sup>. The incoming raw materials shall be subject to controls and tests by the manufacturer before acceptance. Check of incoming materials shall include control of the inspection documents presented by suppliers.

The frequency of controls and tests conducted during production and on the assembled anchor is laid down in the control plan taking account of the automated manufacturing process of the anchor.

The results of factory production control are recorded and evaluated. The records include at least the following information:

- designation of the product, basic material and components; type of control or testing;
- date of manufacture of the product and date of testing of the product or basic material and components;
- result of control and testing and, if appropriate, comparison with requirements;
- signature of person responsible for factory production control.

The records shall be presented to the inspection body during the continuous surveillance. On request, they shall be presented to ETA-Danmark

Details of the extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the prescribed test plan which is part of the technical documentation of this European Technical Approval.

##### **3.2.2. Tasks of notified bodies**

###### **3.2.2.1 Initial type testing of the product**

For initial type testing the results of the tests performed as part of the assessment for the European Technical Approval shall be used unless there are changes in the production line or plant. In such cases the necessary initial type testing has to be agreed between ETA-Danmark and the notified body

###### **3.2.2.2 Initial inspection of factory and of factory production control**

The approved body shall ascertain that, in accordance with the control plan, the factory and the factory production control are suitable to ensure continuous and orderly manufacturing of the anchor according to the specifications mentioned in 2.1 as well as to the Annexes to the European Technical Approval.

###### **3.2.2.3 Continuous surveillance**

The approved body shall visit the factory at least once a year for regular inspection. It has to be verified that the system of factory production control and the specified automated manufacturing process are maintained taking account of the control plan.

Continuous surveillance and assessment of factory production control have to be performed according to the control plan.

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<sup>5</sup> The control plan has been deposited at ETA-Danmark and is only made available to the approved bodies involved in the conformity attestation procedure.

The results of product certification and continuous surveillance shall be made available on demand by the certification body or inspection body, respectively, to ETA-Danmark. In cases where the provisions of the European Technical Approval and the control plan are no longer fulfilled the conformity certificate shall be withdrawn.

### **3.3 CE marking**

The CE marking shall be affixed on each packaging of anchors and/or injection mortar cartridge. The symbol « CE » shall be accompanied by the following information:

- identification number of the certification body;
- name or identifying mark of the - producer and manufacturing plant;
- the last two digits of the year in which the CE-marking was affixed;
- number of the EC certificate of conformity;
- No. of ETA Guideline
- number of the European Technical Approval;
- use category (ETAG 001-1 option 1 or 7)
- size

## 4 Assumptions under which the fitness of the product for the intended use was favourably assessed

### 4.1 Manufacturing

The anchors are manufactured in accordance with the provisions of the European Technical Approval using the automated manufacturing process as identified during inspection of the plant by ETA-Danmark and the approved body and laid down in the technical documentation.

### 4.2 Installation

#### 4.2.1 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed in accordance with the EOTA Technical Report TR 029 "Design of bonded anchors" under the responsibility of an engineer experienced in anchorages and concrete work. Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).

#### 4.2.2 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on the site;
- use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor;
- use of the anchor with commercial standard rods, washers and hexagonal nuts under the following requirements:
  - o material, dimensions and mechanical properties according to the specifications given in Annexes 2 to 3,
  - o confirmation of material and mechanical properties by inspection certificate 3.1 according to EN-10204:2004; the documents should be stored,
  - o marking of the threaded rod with the envisaged embedment depth; this may be done by the manufacturer of the rod or the person on job site,
- anchor installation in accordance with the manufacturer's specifications and drawings

prepared for that purpose and using the tools indicated in the technical documentation of this ETA;

- checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply;
- check of concrete being well compacted, e.g. without significant voids;
- keeping the effective anchorage depth
- keeping of the edge distance and spacing to the specified values without minus tolerances,
- positioning of the drill holes without damaging the reinforcement,
- in case of aborted drill hole: the drill hole shall be filled with mortar,
- clearing the hole of drilling dust; the hole shall be cleaned by at least four blowing operations, by at least four brushing operations followed again by at least four blowing operations, before brushing cleaning the brush and checking whether the brush diameter according to Annex 6, Table 5 and 6 is sufficient,
- anchor installation ensuring the specified embedment depth: embedment depth control;
- mortar injection by using the equipment including the special mixing nozzle (mixer) shown in Annex 4; discarding the first part of mortar of each new cartridge until an homogeneous color is achieved; taking from the manufacturer instruction the admissible processing time (open time) of a cartridge as a function of the ambient temperature of the concrete; filling the drill hole uniformly from the drill hole bottom, in order to avoid entrapment of air; removing the special mixing nozzle slowly bit by bit during pressing-out; filling the drill hole with a quantity of the injection mortar corresponding to 2/3 of the drill hole depth; inserting immediately the threaded rod, slowly and with a slight twisting motion, removing excess of injection mortar around the rod; observing the loading (curing) time according to Annex 3, Table 4 until the rod may be torqued or loaded;
- anchor component installation temperature shall be at least +5°C,
- during installation and curing of the injection mortar the temperature of the concrete must not fall below +0°C,
- application of the torque moment given in Annex 12, Table 7 using a calibrated torque wrench.

#### 4.2.3 Responsibility of the manufacturer

It is the manufacturer's responsibility to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to in 4.2.1. and 4.2.2. is given to those who are concerned. This information may be made by reproduction of the respective parts of the European Technical Approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

- drill bit diameter,
- threaded rod diameter,
- minimum installation depth
- maximum thickness of the fixture,
- required torque moment,
- admissible service temperature range,
- loading (curing) time of the bonding material

- depending on the installation temperature,
- information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- reference to any special installation equipment needed,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

#### 5 Recommendations on packaging, transport and storage

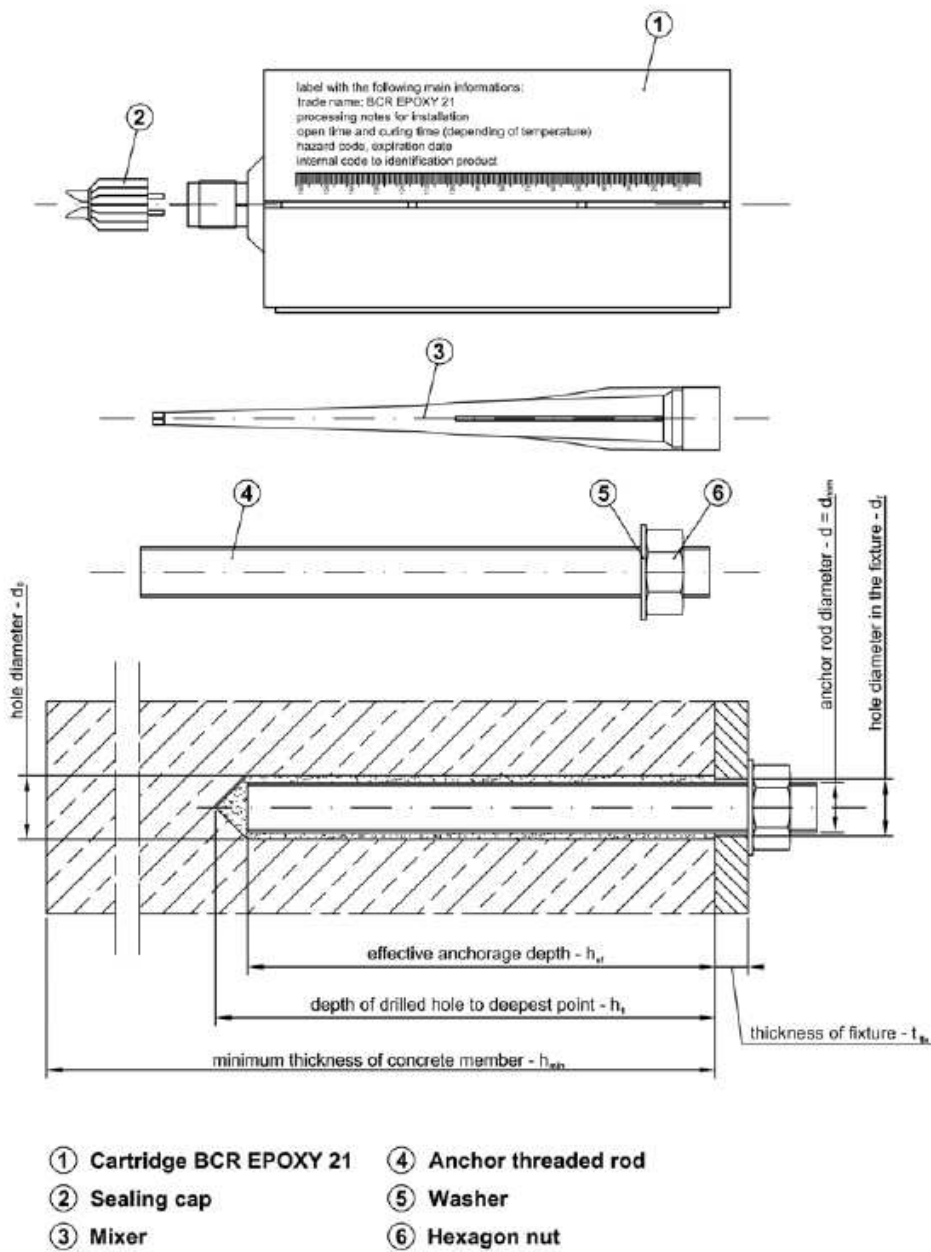
The mortar cartridges shall be protected against sun radiation and shall be stored according to the manufacturer's instructions in dry conditions at temperatures of at least +5°C to not more than +30°C.

Mortar cartridges with expired shelf life must no longer be used.



Thomas Bruun  
Manager, ETA-Danmark





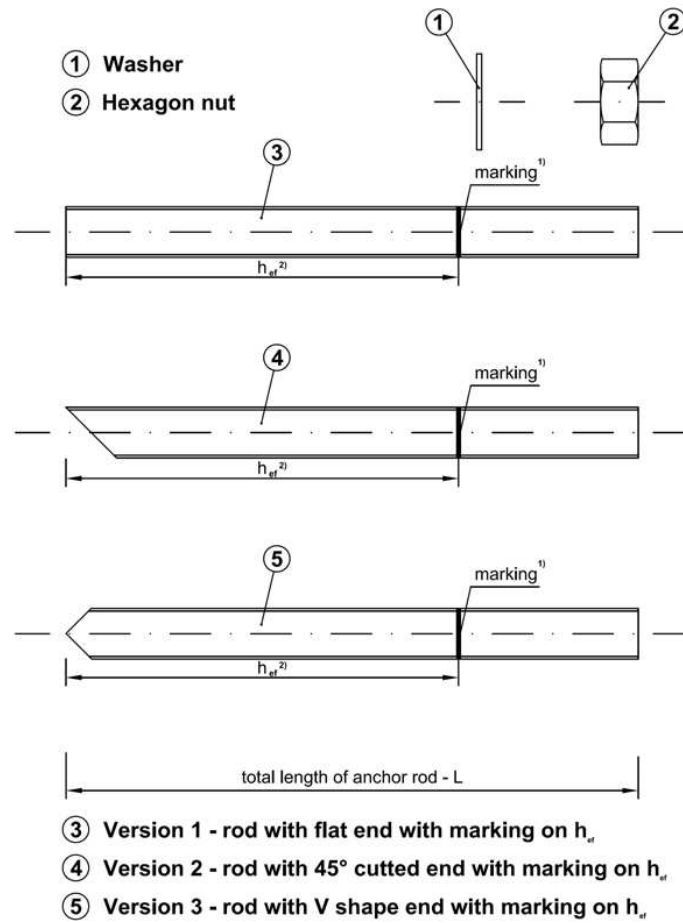
Use in non-cracked concrete with size from M8 to M30 and cracked concrete with size from M12 to M24. Overhead installation is allowable with all size.

**Use category:** installation in dry or wet concrete or in a flooded holes (not sea water).

**Temperature range:**

-40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C)  
-40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)

BOSSONG BCR EPOXY 21	Annex 1 of European Technical Approval ETA-11/0344
Product and intended use	



**Table 1: Threaded rod dimensions**

Size	d [mm]	$h_{ef,min}$ [mm]	$h_{ef,max}$ [mm]
M8	8	60	160
M10	10	60	200
M12	12	70	240
M16	16	80	320
M20	20	90	400
M24	24	96	480
M27	27	110	540
M30	30	120	600

<sup>1)</sup> Marking according to clause 2.1.2. of ETAG 001 – Part five, February 2008.

<sup>2)</sup> Effective anchorage depths according to the range specified in table 1.

**BOSSONG BCR EPOXY 21**

Threaded rod types and dimensions

**Annex 2**

of European  
Technical Approval  
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**Table 2: Threaded rod materials**

Part	Designation		
	Steel, zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042	Stainless steel	High corrosion resistance stainless steel (HCR)
Threaded rod	Steel, property class 5.8, 8.8, acc. to EN ISO 898-1	Material 1.4401 / 1.4571 acc. to EN 10088; property class 70 and 80 (A4-70 and A4-80) acc. to EN ISO 3506	Material 1.4529 / 1.4565/1.4547, acc. to EN 10088; property class 70 acc. to EN ISO 3506
Hexagon nut	Steel, property class 5, 8 acc. to EN 20898-2; corresponding to threaded rod material	Material 1.4401 / 1.4571 acc. to EN 10088; property class 70 and 80 (A4-70 and A4-80) acc. to EN ISO 3506	Material 1.4529 / 1.4565/1.4547, acc. to EN 10088; property class 70 acc. to EN ISO 3506
Washer	Steel, acc. to EN ISO 7089; corresponding to threaded rod material	Material 1.4401 / 1.4571 acc. to EN 10088; corresponding to threaded rod material	Material 1.4529 / 1.4565/1.4547, acc. to EN 10088; corresponding to threaded rod material

Commercial standard threaded rods with:

- material and mechanical properties according to Table 2,
- confirmation of material and mechanical properties by inspection certificate 3.1 according to EN-10204:2004,
- marking of the threaded rod with the embedment depth.

**Table 3: Injection mortar**

Product	Composition
<b>BOSSONG BCR EPOXY 21</b> two components injection mortar <sup>3)</sup>	Additive: quartz Bonding agent: epoxy resin

**Table 4: Minimum curing time<sup>3)</sup>**

Concrete temperature	Processing time	Minimum curing time <sup>5)</sup>
0°C <sup>4)</sup>	3 h 20 min	54 h
5°C <sup>4)</sup>	2 h 30 min	41 h
10°C	1 h 40 min	28 h
15°C	1 h 10 min	22 h
20°C	50 min	16 h
25°C	30 min	14 h
30°C	20 min	12 h

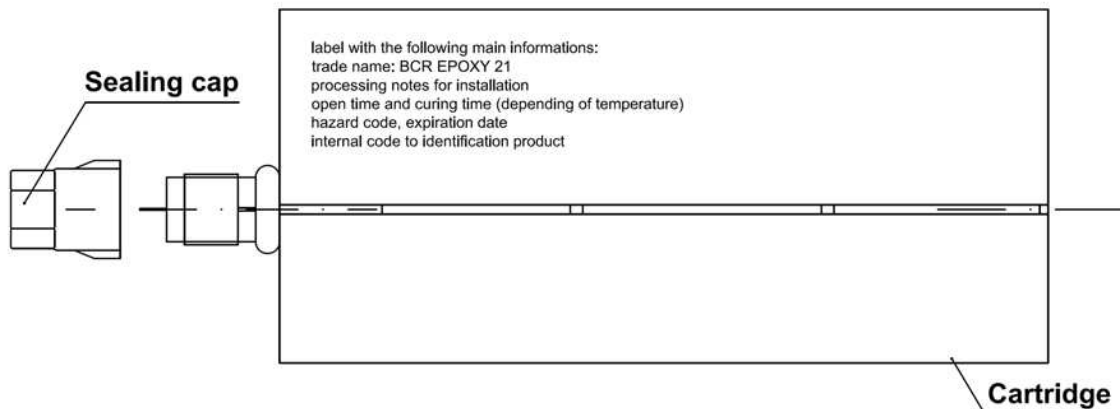
<sup>3)</sup> the minimum time from the end of the mixing to the time when the anchor may be torque or loaded (whichever is longer).

<sup>4)</sup> minimum resin temperature recommended, for injection between 5°C and 0°C, equal to 10°C.

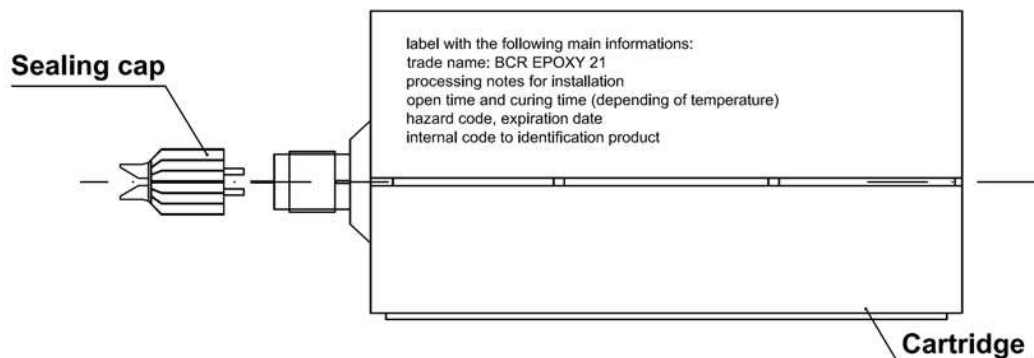
<sup>5)</sup> minimum curing time for dry, wet and flooded hole conditions.

<b>BOSSONG BCR EPOXY 21</b>	<b>Annex 3</b> of European Technical Approval ETA-11/0344
Materials and curing time	

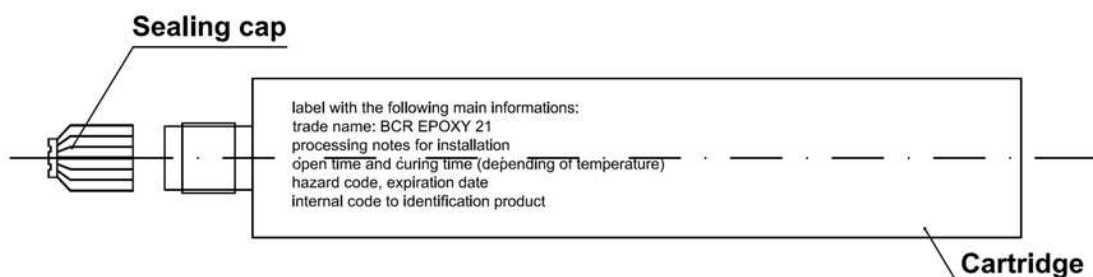
### BCR EPOXY 21 - 900 ml cartridge - syde by syde cartridge



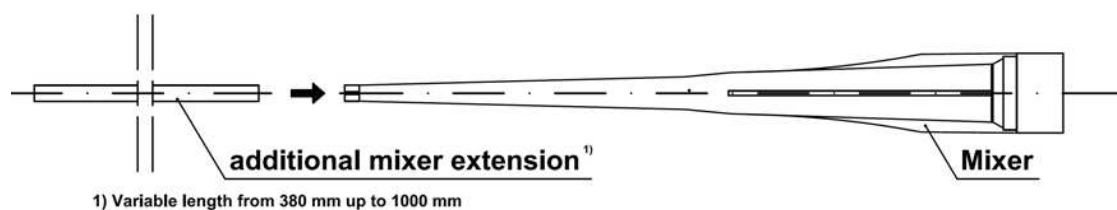
### BCR EPOXY 21 - 400 ml cartridge - syde by syde cartridge



### BCR EPOXY 21 - 265 ml cartridge - peeler cartridge



### MIXER - the mixer is suitable for each type of cartridge

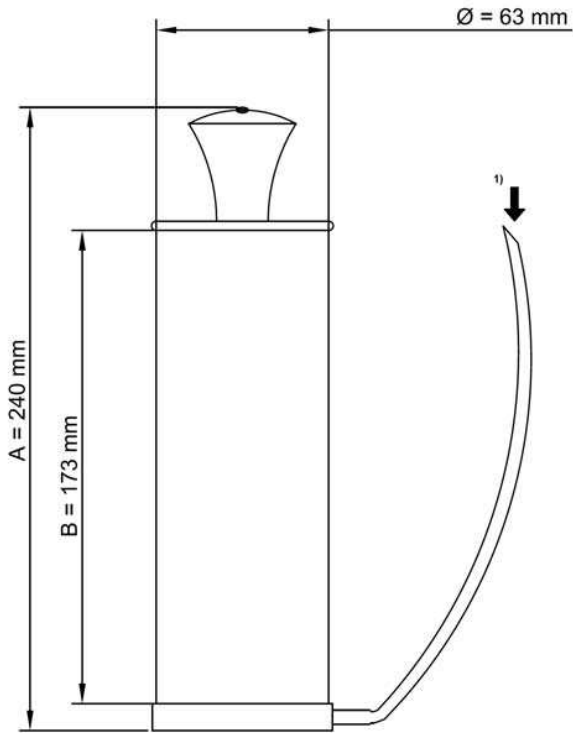


BOSSONG BCR EPOXY 21

Cartridge types and sizes

**Annex 4**  
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# Manual blower pump: nominal dimensions



It is possible to use the mixer extension (see Annex 4) with the manual blower pump.

However it is possible to blow the hole using the mechanical air system (compressed air) also with the mixer extension



Suitable min pressure 6 bar at 6 m<sup>3</sup>/h  
Oil-free compressed air  
Recommended air gun with an orifice opening of minimum 3.5 mm in diameter

1) Position to insert the mixer extension

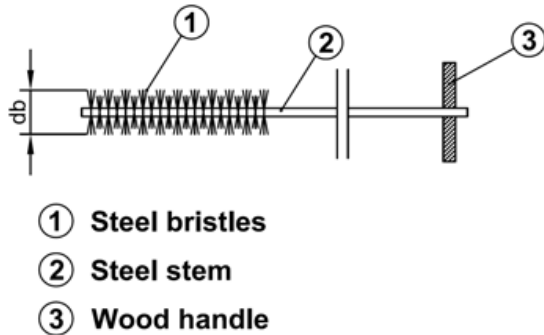


Mixer extension (from 380 mm to 1000 mm) with nominal diameter equal to 8 mm

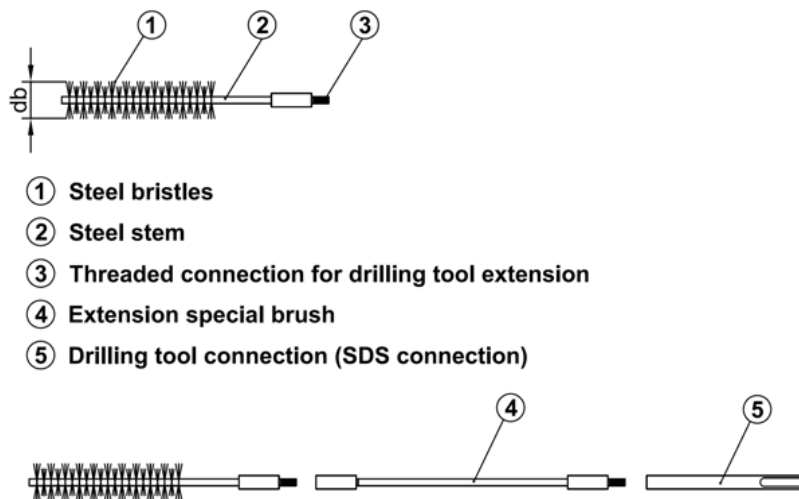
**BOSSONG BCR EPOXY 21**

Cleaning tools (1)

**Annex 5**  
of European  
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ETA-11/0344

**Standard brush****Table 5: Standard brush diameter**

Threaded rod diameter - d			M8	M10	M12	M16	M20	M24	M27	M30
$d_0$	Nominal drill hole	[mm]	10	12	14	18	24	28	30	35
$d_b$	Brush diameter	[mm]	12	14	16	20	26	30	32	37

**Special brush****Table 6: Special brush diameter (mechanical brush)**

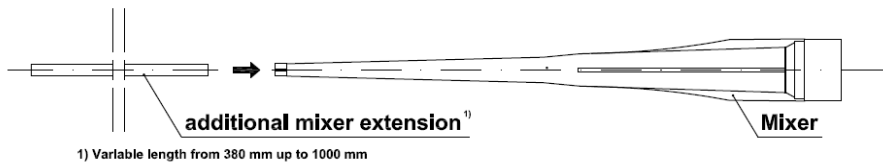
Threaded rod diameter - d			M16	M20	M24	M27	M30
$d_0$	Nominal drill hole	[mm]	18	24	28	30	35
$d_b$	Brush diameter	[mm]	20	26	30	32	37

**BOSSONG BCR EPOXY 21**

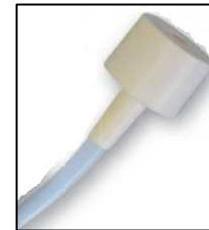
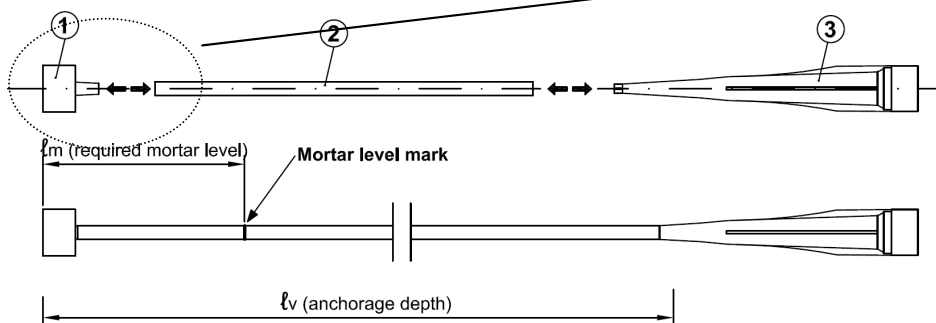
Cleaning tools (2)

**Annex 6**  
of European  
Technical Approval  
ETA-11/0344

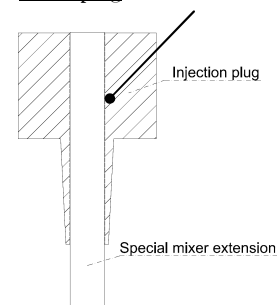
**Use the mixer extension (assembled on the standard mixer) for the injection up to 300 mm if necessary.**



**Use this system for special conditions:**



Insert the special mixer extension in the inner diameter of the injection plug up to reach the top of the plug



- ① Injection plug (nominal diameter according to the nominal diameter of drilled hole)
- ② Special mixer extension (variable length with nominal diameter 10 mm)  
Mark the required mortar level  $l_m$  and embedment depth  $l_v$  with tape or marker on the injection extension. Quick estimation:  $l_m = 1/3 \cdot l_v$   
Continue injection until the mortar level mark  $l_m$  becomes visible.
- ③ Special short mixer (suitable for all size of cartridge)

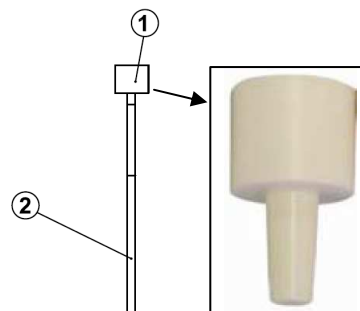
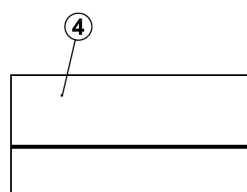
**These tools allow the application in special conditions:**

- Installation with anchorage depth greater than 300 mm
- overhead installation.

For these applications is recommended the use of the injection pneumatic pump.

### System assembled

- ① Injection plug
- ② Special mixer extension
- ③ Special short mixer
- ④ BCR EPOXY 21 cartridge
- ⑤ Sample of injection pneumatic pump







**BOSSONG BCR EPOXY 21**

Tools for injection (1)


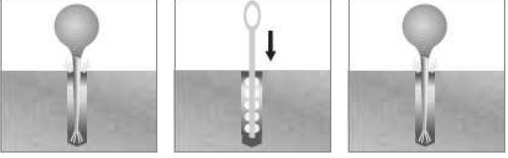
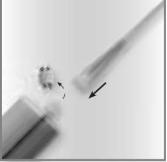
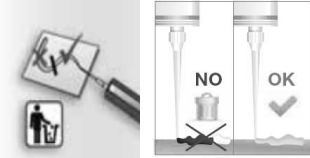
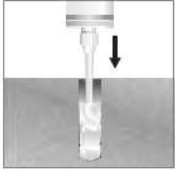
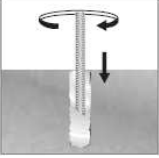
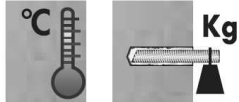
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Resin injection pump details		
Pump example	Size cartridge	Type
	900 ml	Pneumatic
	400 ml	Pneumatic
	400 ml	Manual (up to 300 mm anchorage depth)
	265 ml	Manual (up to 300 mm anchorage depth)

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Tools for injection (2)	




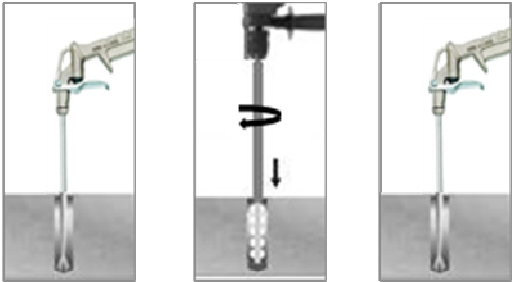

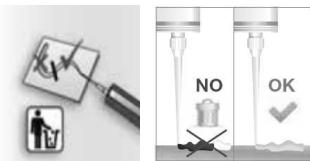
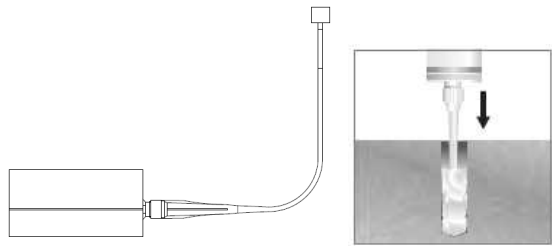
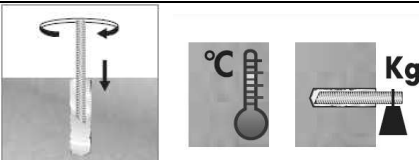
1		<p>Drill the hole with the correct diameter and depth using a rotary percussive machine. Check the perpendicularity of the hole during the drilling operation.</p>
2	 <p><b>4x Blower Manual Pump</b> <b>4x Standard Brush</b> <b>4x Blower Manual Pump</b> if necessary use a mixer extension for the blower operation (see Annex 5)</p>	<p>Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations, by at least 4 brushing operations followed again by at least 4 blowing operations; before brushing clean the brush and check (see Annex 6, standard brush) if the brush diameter is sufficient. For the blower tools see Annex 5.</p>
3		<p>Unscrew the front cup, screw on the mixer and insert the cartridge in the gun.</p>
4		<p>Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two component, comes out from the mixer with an uniform color.</p>
5	 <p>if necessary use a mixer extension for the injection (see Annex 7)</p>	<p>Fill the drilled hole uniformly starting from the drilled hole bottom, in order to avoid entrapment of the air; remove the mixer slowly bit by bit during pressing-out; filling the drill hole with a quantity of the injection mortar corresponding to 2/3 of the drill hole depth.</p>
6	 <p><b>ATTENTION: Use the rods dry and free oil and other contaminants</b></p> 	<p>Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex 3. Wait the curing time according Annex 3.</p>

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Installation procedure up to 300 mm depth

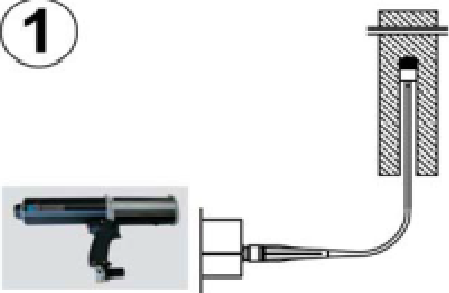
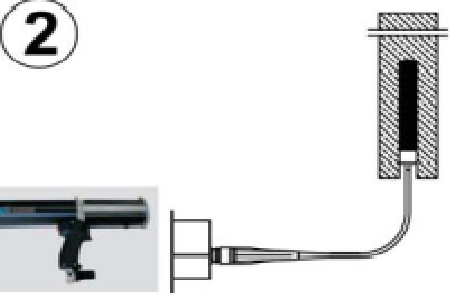
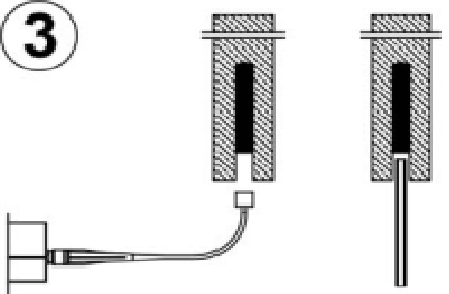
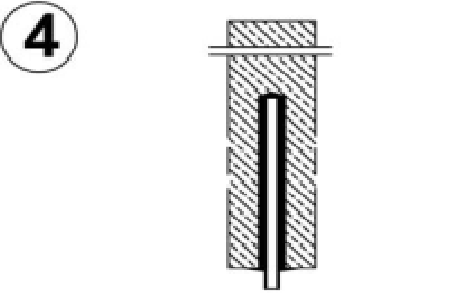
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1		Drill the hole with the correct diameter and depth using a rotary percussive machine. Check the perpendicularity of the hole during the drilling operation.
2	 4 x 5 seconds      4x      4 x 5 seconds <b>ATTENTION: compressed air free oil</b>	Clean the hole from drilling dust: the hole shall be cleaned by at least 4 blowing operations (5 seconds for single operation) with compressed air, by at least 4 brushing operations with special brush followed again by at least 4 blowing operations (5 seconds for single operation) with compressed air. Before brushing clean the brush and check (see Annex 6, special brush) if the brush diameter is sufficient. For the blower tools see the page 9.
3		Unscrew the front cup of the 400 ml or 900 ml size cartridges, screw on the mixer and insert the cartridge in the proper pneumatic-pump.
4		Before starting to use the cartridge, eject a first part of the product, being sure that the two components are completely mixed. The complete mixing is reached only after that the product, obtained by mixing the two component, comes out from the mixer with an uniform color.
5		Before starting the injection, assemble the system according to Annex 7. After that, fill the drilled hole uniformly from the drilled hole bottom, in order to avoid entrapment of the air; remove the special mixer extension with injection plug slowly bit by bit during pressing-out; filling the drill hole with a quantity of the injection mortar corresponding to 2/3 of the drill hole depth. Procedure for overhead installation are detailed in Annex 11.
6	 <b>ATTENTION: Use the rods dry and free oil and other contaminants</b>	Insert immediately the rod, marked according to the proper anchorage depth, slowly and with a slight twisting motion, removing excess of injection mortar around the rod. Observe the processing time according Annex 3. Wait the curing time according Annex 3.
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Installation procedure up to 600 mm depth		

## Overhead installation procedure

In addition to standard procedure, for overhead installation, following the below procedure

<p><b>1</b></p> 	<p><b>1 - Start injection</b></p> <p>Inject from the bottom of the hole. Maintain this position during the injection phase.</p>
<p><b>2</b></p> 	<p><b>2 - Injection phase</b></p> <p>Inject the product about 2/3 of the hole depth. During the injection maintain this position to assure the correct installation</p>
<p><b>3</b></p> 	<p><b>3 - End injection</b></p> <p>Remove the injection plug. Insert immediately the rod (turn the rod during the insertion).</p>
<p><b>4</b></p> 	<p><b>4 - End installation</b></p> <p>To avoid the slipping of the rod during the open time of the product (due to the rod own weight) use a temporary interlocking element (for ex. wedge of wood)</p>

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Overhead installation procedure

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**Table 7: Installation data**

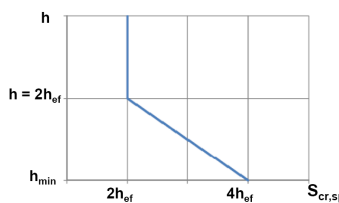
Size		M8	M10	M12	M16	M20	M24	M27	M30
Nominal drilling diameter	$d_0$ [mm]	10	12	14	18	24	28	30	35
Maximum diameter hole in the fixture	$d_{fix}$ [mm]	9	12	14	18	22	26	29	33
Embedment depth	$h_{ef,min}$ [mm]	60	60	70	80	90	96	110	120
	$h_{ef,max}$ [mm]	160	200	240	320	400	480	540	600
Depth of the drilling hole	$h_1$ [mm]	$h_{ef} + 5 \text{ mm}$							
Minimum thickness of the slab	$h_{min}$ [mm]	$h_{ef} + 30 \text{ mm}; \geq 100 \text{ mm}$				$h_{ef} + 2d_0$			
Torque moment	$T_{inst}$ [Nm]	10	20	40	80	130	200	270	300
Thickness to be fixed	$t_{fix,min}$ [mm]	$> 0$							
	$t_{fix,max}$ [mm]	$< 1500$							
Minimum spacing	$S_{min}$ [mm]	40	50	60	80	100	120	135	150
Minimum edge distance	$C_{min}$ [mm]	40	50	60	80	100	120	135	150

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Installation data

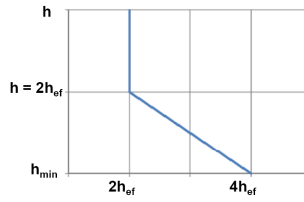
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**Table 8a: Characteristic values for tension load in non cracked concrete**

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure										
Characteristic resistance with standard threaded rod grade 5.8	N <sub>Rk,s</sub>	[kN]	18	29	42	78	122	176	229	280
Partial safety factor	γ <sub>Ms</sub>	[-]	1,50							
Characteristic resistance with standard threaded rod grade 8.8	N <sub>Rk,s</sub>	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ <sub>Ms</sub>	[-]	1,50							
Characteristic resistance with standard threaded rod stainless steel A4-70 (class 70) and HCR (class 70)	N <sub>Rk,s</sub>	[kN]	26	41	59	110	171	247	321	392
Partial safety factor	γ <sub>Ms</sub>	[-]	1,87							
Characteristic resistance with standard threaded rod stainless steel A4-80 (class 80)	N <sub>Rk,s</sub>	[kN]	29	46	67	126	196	282	367	449
Partial safety factor	γ <sub>Ms</sub>	[-]	1,60							
Combined pullout and concrete cone failure										
Characteristic bond resistance in non-cracked concrete C20/25 in the temperature range - 40°C/+40°C (explanation see section 1)	τ <sub>Rk,ucr</sub>	[N/mm <sup>2</sup> ]	12	11	11	11	10	10	10	10
Characteristic bond resistance in non-cracked concrete C20/25 in the temperature range - 40°C/+80°C (explanation see section 1)	τ <sub>Rk,ucr</sub>	[N/mm <sup>2</sup> ]	9,0	8,5	8,5	8,5	7,0	7,0	7,0	7,0
Increasing factor C30/37	ψ <sub>c</sub>	[-]	1,08							
Increasing factor C40/50			1,15							
Increasing factor C50/60			1,19							
Partial safety factors for in use category 1 (γ <sub>2</sub> = 1,2 included)	γ <sub>Mp</sub>	[-]	1,50							
Partial safety factors for in use category 2 (γ <sub>2</sub> = 1,2 included)			1,80							
Spacing	S <sub>cr,Np</sub>	[mm]	20 d (τ <sub>Rk,ucr</sub> / 7,5) <sup>0,5</sup> ≤ 3h <sub>ef</sub> τ <sub>Rk,ucr</sub> for C20/25 and d according to Annex 2, Table 1							
Edge distance	C <sub>cr,Np</sub>	[mm]	0,5 S <sub>cr,Np</sub>							
Splitting failure										
Partial safety factors for in use category 1 (γ <sub>2</sub> = 1,2 included)	γ <sub>Msp</sub>	[-]	1,50							
Partial safety factors for in use category 2 (γ <sub>2</sub> = 1,2 included)			1,80							
Spacing	S <sub>cr,sp</sub>	[mm]					if h = h <sub>min</sub> - S <sub>cr,sp</sub> = 4 h <sub>ef</sub>  if h <sub>min</sub> ≤ h < 2 h <sub>ef</sub> - S <sub>cr,sp</sub> = interpolate value  if h ≥ 2 h <sub>ef</sub> - S <sub>cr,sp</sub> = 2 h <sub>ef</sub>			
Edge distance	C <sub>cr,sp</sub>	[mm]	0,5 S <sub>cr,sp</sub>							

**BOSSONG BCR EPOXY 21**Characteristic resistance under tension loads in non cracked concrete  
design method A**Annex 13**  
of European  
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**Table 8b: Characteristic values for tension load in cracked concrete**

Size			M12	M16	M20	M24
Steel failure						
Characteristic resistance with standard threaded rod grade 5.8	N <sub>Rk,s</sub>	[kN]	42	78	122	176
Partial safety factor	γ <sub>Ms</sub>	[-]	1,50			
Characteristic resistance with standard threaded rod grade 8.8	N <sub>Rk,s</sub>	[kN]	67	126	196	282
Partial safety factor	γ <sub>Ms</sub>	[-]	1,50			
Characteristic resistance with standard threaded rod stainless steel A4-70 (class 70) and HCR (class 70)	N <sub>Rk,s</sub>	[kN]	59	110	171	247
Partial safety factor	γ <sub>Ms</sub>	[-]	1,87			
Characteristic resistance with standard threaded rod stainless steel A4-80 (class 80)	N <sub>Rk,s</sub>	[kN]	67	126	196	282
Partial safety factor	γ <sub>Ms</sub>	[-]	1,60			
Combined pullout and concrete cone failure						
Characteristic bond resistance in cracked concrete C20/25 in the temperature range - 40°C/+40°C (explanation see section 1)	τ <sub>Rk,cr</sub>	[N/mm <sup>2</sup> ]	7,0	7,0	7,0	7,0
Characteristic bond resistance in cracked concrete C20/25 in the temperature range - 40°C/+80°C (explanation see section 1)	τ <sub>Rk,cr</sub>	[N/mm <sup>2</sup> ]	5,5	5,5	5,5	5,5
Increasing factor C30/37	ψ <sub>c</sub>	[-]	1,00			
Increasing factor C40/50			1,00			
Increasing factor C50/60			1,00			
Partial safety factors for in use category 1 (γ <sub>2</sub> = 1,2 included)	γ <sub>Mp</sub>	[-]	1,50			
Partial safety factors for in use category 2 (γ <sub>2</sub> = 1,2 included)			1,80			
Spacing	S <sub>cr,Np</sub>	[mm]	20 d (τ <sub>Rk,ucr</sub> / 7,5) <sup>0,5</sup> ≤ 3h <sub>ef</sub> τ <sub>Rk,ucr</sub> for C20/25 and d according to Annex 2, Table 1			
Edge distance	C <sub>cr,Np</sub>	[mm]	0,5 S <sub>cr,Np</sub>			
Splitting failure						
Partial safety factors for in use category 1 (γ <sub>2</sub> = 1,2 included)	γ <sub>Msp</sub>	[-]	1,50			
Partial safety factors for in use category 2 (γ <sub>2</sub> = 1,2 included)			1,80			
Spacing	S <sub>cr,sp</sub>	[mm]		if h = h <sub>min</sub> - S <sub>cr,sp</sub> = 4 h <sub>ef</sub>  if h <sub>min</sub> ≤ h < 2 h <sub>ef</sub> - S <sub>cr,sp</sub> = interpolate value  if h ≥ 2 h <sub>ef</sub> - S <sub>cr,sp</sub> = 2 h <sub>ef</sub>		
Edge distance	C <sub>cr,sp</sub>	[mm]	0,5 S <sub>cr,sp</sub>			

**BOSSONG BCR EPOXY 21**Characteristic resistance under tension loads in cracked concrete  
design method A**Annex 14**  
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**Table 9: Characteristic values for shear load in non cracked and cracked concrete**

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure without lever arm										
Characteristic resistance with standard threaded rod grade 5.8	V <sub>Rk,s</sub>	[kN]	9	14	21	39	61	88	115	140
Partial safety factor	γ <sub>Ms</sub>	[-]	1,25							
Characteristic resistance with standard threaded rod grade 8.8	V <sub>Rk,s</sub>	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ <sub>Ms</sub>	[-]	1,25							
Characteristic resistance with standard threaded rod stainless steel A4-70 (class 70) and HCR (class 70)	V <sub>Rk,s</sub>	[kN]	13	20	29	55	86	124	161	196
Partial safety factor	γ <sub>Ms</sub>	[-]	1,56							
Characteristic resistance with standard threaded rod stainless steel A4-80 (class 80)	V <sub>Rk,s</sub>	[kN]	15	23	34	63	98	141	184	224
Partial safety factor	γ <sub>Ms</sub>	[-]	1,33							
Steel failure with lever arm										
Characteristic resistance with standard threaded rod grade 5.8	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]	19	37	65	166	324	561	832	1124
Partial safety factor	γ <sub>Ms</sub>	[-]	1,25							
Characteristic resistance with standard threaded rod grade 8.8	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]	30	60	105	226	519	898	1331	1799
Partial safety factor	γ <sub>Ms</sub>	[-]	1,25							
Characteristic resistance with standard threaded rod stainless steel A4-70 (class 70) and HCR (class 70)	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]	26	52	92	233	454	786	1165	1574
Partial safety factor	γ <sub>Ms</sub>	[-]	1,56							
Characteristic resistance with standard threaded rod stainless steel A4-80 (class 80)	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]	30	60	105	226	519	898	1331	1799
Partial safety factor	γ <sub>Ms</sub>	[-]	1,33							
Concrete pry-out failure										
Factor k in in equation (5.7) of EOTA Technical Report TR 029	k	[-]	2,0							
Partial safety factors (γ <sub>2</sub> = 1,0 included)	γ <sub>Mc</sub>	[-]	1,50							
Concrete edge failure										
See section 5.2.3.4 of EOTA Technical Report TR 029										
Partial safety factors (γ <sub>2</sub> = 1,0 included)	γ <sub>Mc</sub>	[-]	1,50							

**BOSSONG BCR EPOXY 21**

Characteristic resistance under shear loads  
in non cracked and cracked concrete – design method A

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**Table 10: Displacement under tension and shear load in non cracked concrete**

Size			M8	M10	M12	M16	M20	M24	M27	M30
Characteristic displacement in non-cracked concrete C20/25 to C50/60 under tension and shear loads for each service temperature range										
Admissible service load	F	[kN]	7,6	9,5	14,3	19,0	23,8	35,7	45,2	54,8
Displacement	$\delta_0$	[mm]	0,29	0,31	0,36	0,37	0,38	0,54	0,67	0,80
	$\delta_\infty$	[mm]	0,80	0,80	0,80	0,80	0,80	0,80	0,80	0,80

**Table 11: Displacement under tension and shear load in cracked concrete**

Size			M12	M16	M20	M24
Characteristic displacement in cracked concrete C20/25 to C50/60 under tension and shear loads for each service temperature range						
Admissible service load	F	[kN]	9,5	14,3	19,0	23,8
Displacement	$\delta_0$	[mm]	0,36	0,36	0,36	0,36
	$\delta_\infty$	[mm]	1,85	1,85	1,85	1,85

**BOSSONG BCR EPOXY 21**Displacement under service loads: tension and shear  
in non cracked and cracked concrete**Annex 16**  
of European  
Technical Approval  
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